

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Status of Claims:

No claims are requested to be cancelled.

Claims 9 and 29 are currently being amended.

No claims are being added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-40 are now pending in this application.

Objections to the Specification:

The Office Action in Item 1 objects to the disclosure because the acronyms “NEMS” and “AFM” should be defined. The above amendment to the specification incorporates definitions of these terms without adding new matter. Applicants respectfully request that these objections be withdrawn.

Claim Objections:

Claims 9-13 and 29-33 were objected to because of informalities. Claims 9 and 29 have been amended to overcome this objection. Applicants respectfully request that these objections be withdrawn.

Claim Rejections – 35 U.S.C. § 103(a):

Claims 1, 4, 14, 15, 20, 21, 24, 34, 35 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication 2003/0137216 to Tomayo de Miguel et al. (Tamayo de Miguel) in view of U.S. Patent Application Publication No. 2003/0043925 to Stopler et al. (Stopler).

Independent claim 1 recites “mixing the output signal with a reference signal; filtering the mixed output signal to generate a correlator output, $r(t)$; detecting the correlator output to generate a signal $u(t)$; determining whether the signal $u(t)$ satisfies a predetermined threshold; and deciding whether the signal $u(t)$ represents a predetermined type of interaction between a free ligand in a fluid and receptor attached to the transducer.” Independent claim 21 recites means for performing the above recited steps.

The Office Action in Item 4 indicates that Tamayo de Miguel does not teach mixing the output, filtering the mixed output, detecting the mixer output and determining whether the signal satisfies a threshold. The Office Action in Item 4 further states that Stopler teaches mixing an output and filtering the mixed output (Fig. 2, elements 66 and 68; pars. 78, 81). However, Stopler discloses that L consecutive samples output from the decimator 24 that were grouped by FIFO 60 are identified as an impulse by thresholding their energy, are zeroed by a summer/blanker 66 at the input of match filter 68 (see [0077]; Fig. 2, elements 24, 60, 66 and 68). Stopler does not teach mixing as known in the art. For example, Stopler does not teach an element that mixes signals by accepting two signal inputs at two frequencies and outputting signals at the sum and difference of the frequencies. Additionally, because Stopler does not disclose mixing, this reference does not disclose filtering mixed output to generate a correlator output as claimed. Thus, neither Tamayo de Miguel nor Stopler teach or suggest the claimed mixing and filtering steps.

Item 4 of the Office Action moreover points out that Stopler teaches detecting an output and using a threshold (Fig. 2, decoder 100; Fig. 3, threshold 50). Stopler discloses that the rotator frequency ω (in radians) corresponds to the impulse timing τ from 50 multiplied by frequency difference Δf between successive tones, i.e., $\omega = 2\pi\Delta f\tau$ (see [0085]; Fig. 3, element 50). Stopler does not teach that threshold local maxima 50 is used in determining whether a

signal satisfies a predetermined threshold. Stopler discloses that threshold local maxima provides the impulse timing τ used in the rotator frequency ω (in radians). Thus, neither Tamayo de Miguel nor Stopler teach or suggest the claimed detecting and determining steps.

The Office Action also states that Tamayo de Miguel also teaches a chemical and biosensors that detect the interaction between a ligand and a receptor (par. 7). Tamayo de Miguel disclose that chemical and bio-sensors utilizing micro-fabricated cantilevers of silicon or silicon nitride with a receptor coated on one side of the cantilevers can be optically examined for motion changes using ratio of outputs from a pair of photodetectors (see [0007]). However, this reference does not teach or suggest deciding whether a signal $u(t)$ that has undergone the claimed generating, mixing, filtering, detecting and determining steps represents a type of interaction between a free ligand in a fluid and a receptor attached to the transducer. Stopler does not disclose free ligands and receptors. Thus, Tamayo de Miguel and Stopler neither teach nor suggest the deciding step as claimed.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. MPEP § 2143.03 (quoting *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)). Because the mixing, filtering, detecting, determining and deciding steps recited in independent claim 1 and performed by the means of independent claim 21 are neither taught nor suggested in Tamayo de Miguel and Stopler, there is no establishment of *prima facie* obviousness of independent claims 1 and 21.

Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. § 103(a) as being unpatentable over Tamayo de Miguel in view of Stopler be withdrawn.

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03 (quoting *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)). Similarly, Applicants respectfully request that the rejections under 35 U.S.C. § 103(a) be withdrawn from dependent claims 2, 4-8, 14-18 and 20; and 22, 24-28, 34-38 and 40 from their dependency on independent claims 1 and 21, respectively.

Allowable Subject Matter:

Claims 3, 19, 23 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 9-13 and 29-33 would be allowable if rewritten or amended to overcome the objection for minor informalities discussed above. Applicants thank the Examiner for indicating allowable subject matter in these claims.

Conclusions:

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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